AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
DESIGN AND PRODUCTION DEPARTMENT

APPLICATION OF COMPUTER AIDED TECHNOLOGY IN TURNING

BY

MOHAMED LOTFY YOSSEF IBRAHIM GAMAL EL DEEN
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SUPERVISOR

PROF. DR.

MONIR MOHAMED FARID KOURA

Professor of Prod. Eng. Dept.
Faculty of Engineering
Ain - Shams University

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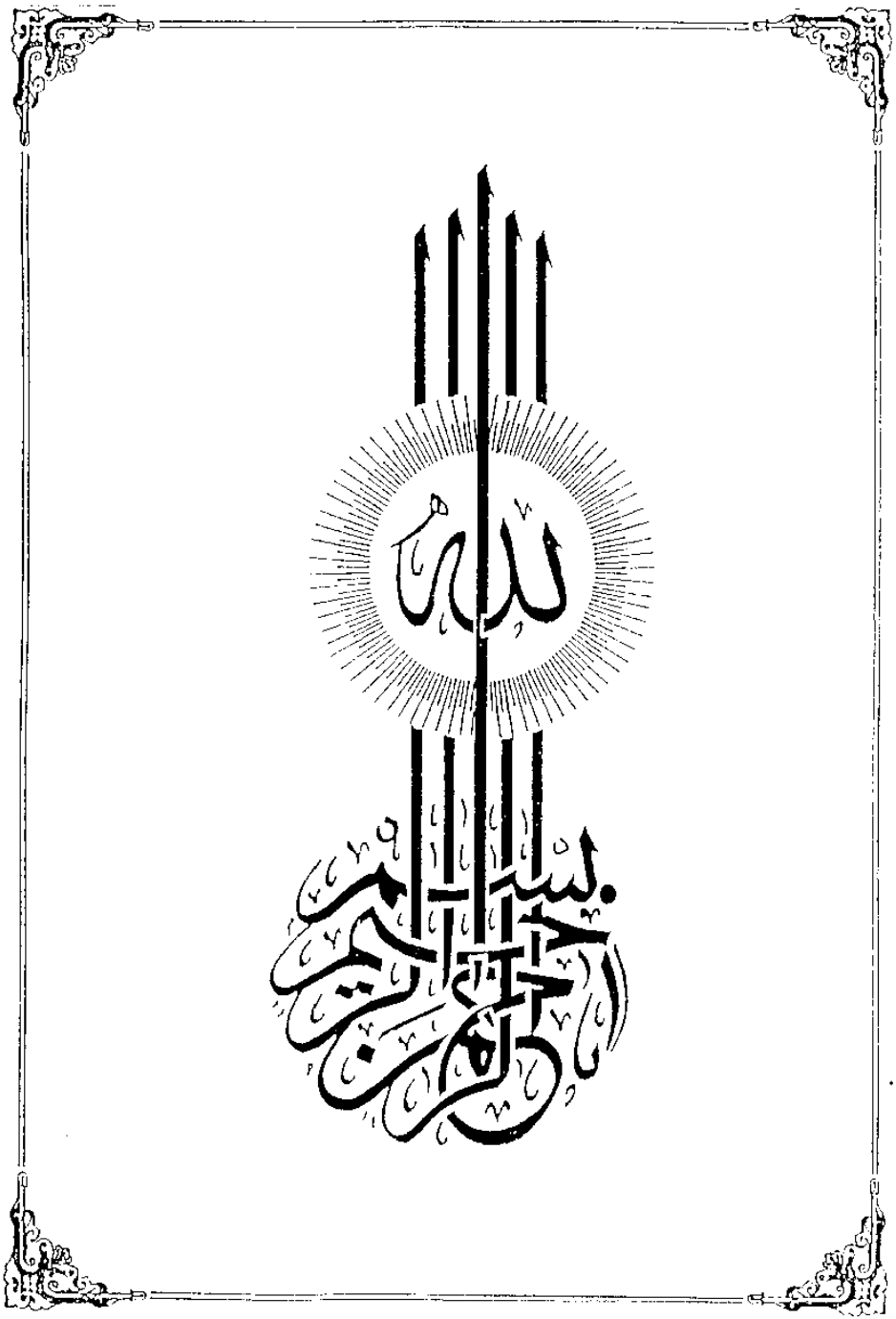

EXAMINATION COMMITTEE

RESEARCHER NAME : MOHAMED LOTFY YOUSSEF IBRAHIM GAMAL EL-DEEN

THESIS TITLE : APPLICATION OF COMPUTER AIDED TECHNOLOGY IN TURNING.

EXAMINATION COMMITTEE:

NO.	NAME	POSITION
1	Prof. Dr. Monir Mohamed Farid Koura.	Prof. of Prod. Eng., Dept. Faculty of Eng., Ain Shams University
2	Prof. Dr. Farok Ahamed El Gayar	Prof. of Ind. Eng., Prod. Eng. Dept., Hilwan University
3	Prof. Dr. M. Salah A. Hamed	Prof. of Production Eng., Chairman of Mech. Eng. Dept., Shoubra Faculty of Eng., Zagazig University.

EXAMINATION DATE:

THESIS GRADE :

SIGNATURE:

NO.	NAME	SIGNATURE
1	Prof. Dr. Monir Mohamed Farid Koura.	
2	Prof. Dr. Farok Ahamed El Gayar	
3	Prof. Dr. M. Salah A. Hamed	

SUPERVISORS

RESEARCHER NAME: MOHAMED LOTFY YOUSSEF IBRAHIM GAMAL EL-DEEN.

THESIS TITLE : APPLICATION OF COMPUTER AIDED TECHNOLOGY IN TURNING.

SUPERVISOR:

NO.	NAME	POSITION	SIGNATURE
1	Prof. Dr. Monir Mohamed Farid Koura	Prof. of Prod. Eng. Dept., Faculty of Eng. Ain Shams University.	

STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master in Mechanical Engineering.

The work included in this thesis was carried out by the author in the Department of Design and Production, Ain Shams University, from 1985 to 1993.

No part of this thesis has been submitted for a degree or a qualification at any other University or Institution.

Date:

Signature:

Name: Mohamed Lotfy Youssef Ibrahim Gamal El-Deen

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Gamal El Deen

TABLE OF CONTENTES

ABSTRACT

Process planning is the systematic determination of the methods and means by which a product is to be manufactured economically and competitively . It,is an important intermediate stage between designing and manafacturing the product .Although process planning conventionaly is carried out by planners who have accumulated practical experiance, there is no guarntee that any one of them will constitute the optimum method for manufacturing certain part. So the process plans frequently reflect only the personal experiance or the alternative methods that may actully be readily available.

In the process planning, a planner must manage and retrieve standards and documents, such as old process plans, established standards, facilities data, machine tool specifications, tooling inventory and stock availability. The production engineers have to spend most of their time in doing there repeated and routine work and they can not concentrate their effort on solving the problems of improving the quality of products and responding the engineering changes and market requirements.

Thus, the main objective of the suggested CAPP system is to prepare process plans of circular components that produced by turning. It describes an optimum manufacturing processes and prescribe full details of steps involved without relying on a planner's individual experiance. Also all the necessary parameters for turning sequence are given such as feed, speed , r.p.m., depth and length of cut , num

ber of cuts and duration of cut. The suggested program was written by "MS BASiC" which can be executed on all IBM personal computers or compatables.

The present thesis consists of five chapters as follows:-

CHAPTER ONE

Provides an introduction to the possible different approaches used in process planning, types of codes structure in coding systems, and an example of the most Computer Aidded Process Planning (CAPP) systems.

CHAPTER TWO

It deals with the design of the proposed system. It discusses the methods that have been implemented to design the investigated system.

CHAPTER THREE.

It deals with the proposed system program. It illustrates the flowcharts aud the operation of the investigated system.

CHAPTER FOUR.

In this chapter three different case studies are given to show the output of the system and to compare between the process plans excecuted by manual way and that produced by the demonstrated system.

CHAPTER FIVE.

It summarizes and discusses results obtained by the demonstrated system. The main objective was satisfied by obtaining a complete computer aided program that defines and determines the sequence of process planning.

NOMENCLATURE

A	DEPTH OF CUT.
AI	ARTIFICIAL INTELLIGENCE.
AL	ALUMINUM
ALL	ALLOY
C	CARBON
CAD	COMPUTER AIDED DESIGN
CAM	COMPUTER AIDED MANUFACTURE
CAPP	COMPUTER AIDED PROCESS PLANNING
Cr	CHROMIUM
EX	EXPERT SYSTEM
f	FEED
GT	GROUP TECHNOLOGY
H	HIGH
HSS	HIGH SPEED STEEL
L	LENGTH
M	MACHINING
MT	MACHINING TIME
N	SPINDLE SPEED
n	NUMBER OF CUTS
NC	NUMERICALLY CONTROLLED
RO	ROUGHNESS
ST	STEEL
TO	TOLERANCE
V	CUTTING SPEED

INTRODUCTION

There are two types of computer aided process planning system: variant and generative. The process plans generated by the variant system are always consistent with those of similar components. Many problems and deficiencies exist when using this system. The most significant problem is the inability of it to provide plans for new components (where no similar component has been planed before.

The generative system utilizes an automatic computerized system to determine the processing decisions for converting a part from a rough to a finished state. Although it is the solution of all problems of variant process planning system, a truly universal generative system is yet to be developed because only some of the auxiliary functions of the process planning can be generated automatically and non of them use the data directly from working drawing.

For such reasons the aim of this investigation is to develop a generative process planning system through which all the necessary data can be taken directly from the working drawig to have all the necessary functions of process planing automatically.